ComDef 2004

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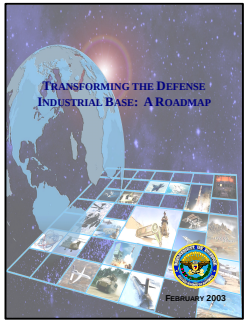
DUSD (Industrial Policy)

September 8, 2004

Setting the Stage for the Defense Industrial Base Capability Study Series

2003 — 2004



Transforming the Defense Industrial Base (02/03)

FINDINGS

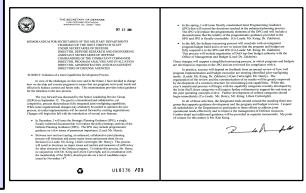
- The Department should view industrial base as composed of operational effects-based sectors
- From program justification through budgeting and acquisition, the Department should organize its decision-making processes to optimize operational effects
- The Department should analyze the results of a systematic assessment of critical technology requirement in each of these sectors.

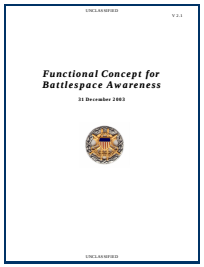
CJCS Instruction 3170.01C Published (06/03)

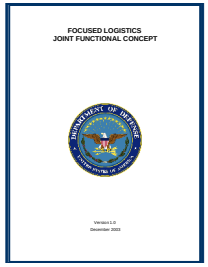
PURPOSE

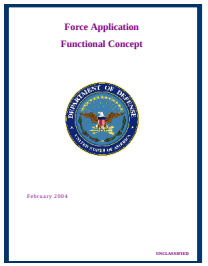
- Established procedures to identify, assess, and prioritize joint military capability need
- Provided a construct for the Department's efforts to re-engineer corporate processes and unify focus on delivering warfighting capabilities
- Serves as the cornerstone in realigning the Department's planning and budgeting processes

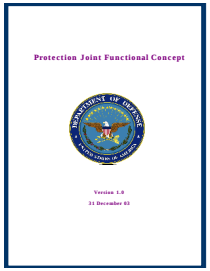
SECDEF Initiates Joint Capabilities Development Process (10/03)

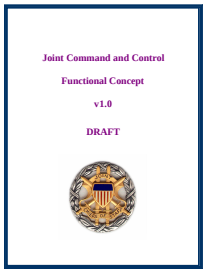






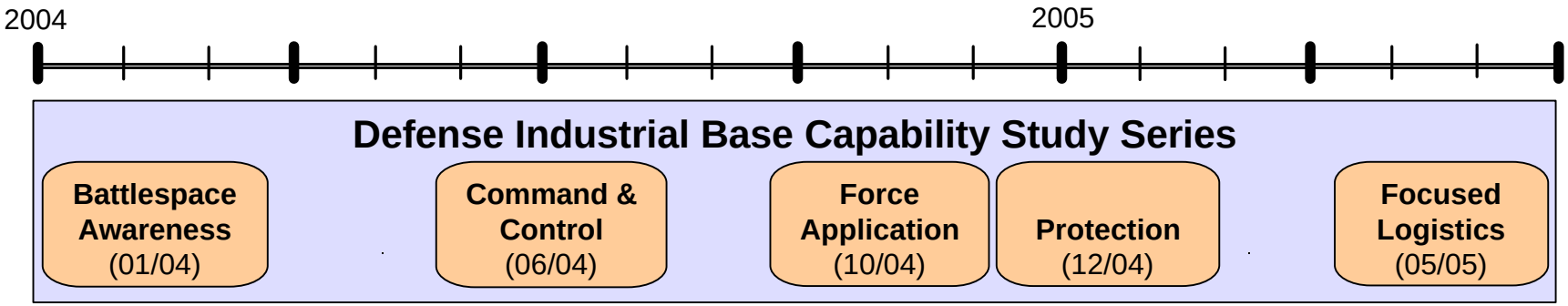






Source: ODUSD(IP)

The Defense Industrial Base Capability Study Series



DEFENSE INDUSTRIAL BASE CAPABILITY STUDY (DIBCS) SERIES STUDY OBJECTIVES
Develop a capabilities-based industrial framework and analytical methodology as a foundation for programmatic and investment decision-making.
Identify technology critical to enabling the new Joint Staff functional warfighter capabilities. Establish a reference database of these kev critical industrial base capabilities mapped to warfighting functional capabilities.
Conduct industrial base capability assessments on priority critical technologies to identify deficiencies.
Develop a systematic method to craft industrial base strategies to remedy industrial base deficiencies identified and encourage proactive, innovative management of the industrial base.

Reports can be viewed and downloaded online at: http://www.acq.osd.mil/ip

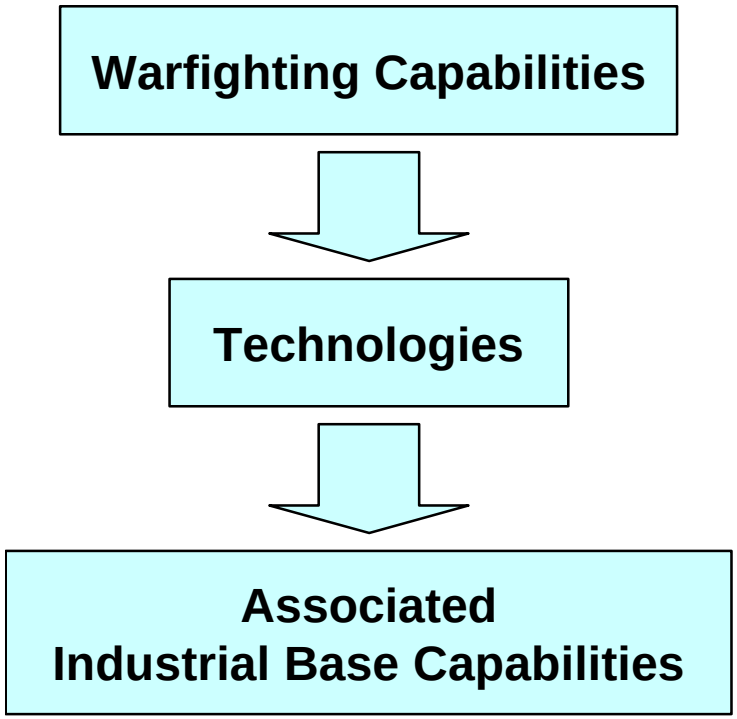
Source: ODUSD(IP)

Joint Staff Functional Concepts

Battlespace Awareness Global Hawk, DCGS, NPOESS, SBIRS-High, E-2 Advanced Hawkeye	Capabilities of commanders and force elements to understand their environment and the adversaries they face. Uses a variety of surveillance capabilities to gather information; a harmonized secure netcentric environment to manage this information; and a collection of capabilities to analyze, understand, and predict.
Command and Control FBCB2, JTRS, WIN-T, AOC-WS, GCCS, GBS, ADV-EHF, NESP	Capabilities that exercise authority and direction over forces to accomplish a mission. Involves planning, directing, coordinating, and controlling forces and operations. Provides the means to recognize what is needed and ensure that appropriate actions are taken.
Force Application SSGN, DDG 51, JDAM, JSOW, CVN 21, MM III	Capabilities to engage adversaries with lethal and non-lethal methods across the entire spectrum of conflict. Includes all battlefield movement and dual-role offensive and defensive combat capabilities in land, sea, air, space, and information domains.
Protection ATIRCM/CMWS, PAC-3, Chem Demil	Capabilities that defend forces and U.S. territory from harm. Includes missile defense and infrastructure protection and other capabilities to thwart force application by an adversary.
Focused Logistics C-130, CH-47, GCSS, MPF, T-AKE, C-17, FMTV, V-22, MH-60, C-5 RERP	Capabilities to deploy, redeploy, and sustain forces anywhere in or above the world for sustained, in-theater operations. Includes traditional mobility functions of airlift, sealift, and spacelift as well as short-haul (intra-theater and battlefield) transportation. Also includes logistics C2, training, equipping, feeding, supplying, maintaining and medical capabilities.

Source: Joint Staff Functional Concepts and ODUSD(IP)

DIBCS Translation Process



"This methodology is consistent with the operational ethos embodied in the U.S. defense industrial base: warfighting capabilities, and the warfighter as the primary constituent, must drive defense demand and the products the Department acquires."

Source: Booz Allen Hamilton and ODUSD(IP)

The Defense Industrial Base Capability Study Series as a Lexicon: From Warfighting to Technology and Industrial Base Capabilities

Operational Capability Framework

The Translation Process

JC2FC Capabilities	
Basic C2	• Monitor and Collect Data
	• Develop a Situational Understanding
	• Develop Courses of Action • Develop a Plan
	• Execute a Plan • Monitor the Execution and Adapt
Collaborative C2	• Networking • Interacting • Sharing Information • Sharing Awareness • Sharing Understanding • Deciding • Synchronizing

Broad Industrial Areas for Command and Control

• Collaborative Management	• Displays
• Communication and Networking	• Location and Identification
• Computers	• Power Generation and Storage
• Data Management	• Software Encryption and Tasking
• Decision Support	• Unmanned Vehicle

=

Technologies & Industrial Base Capabilities

Issues in the Defense Sector of the C2 Industrial Base

Technology	Industrial Base Sufficiency Analysis		
	Domestic Sources	Foreign Sources	
Helmet Mounted Display	5	4	
Swarming Control Tools	Many	Many	
Optical (Laser) Intersatellite Links	2	3	

45 Command and Control Technologies with Sufficient Industrial Base Capabilities

1. Airborne Data Link
2. - Field Programmable Array
3. - Software Definable Transceiver
4. Bandwidth Accelerator
5. CAVE Automatic Virtual Environment
6. - Stereoscopic Eyewear
7. - Stereoscopic Projection
8. Collaborative Intelligence Fusion Tool
9. Collaborative Virtual Workspace
10. Course of Action Generation Software
11. Dynamic Database Fusion Tool
12. Encryption – Over-the-Air-Rekeying (OTAR) Device
13. Hardened Components
14. - Novel Shielding Materials
15. Helmet Mounted Displays – Head Tracking Display
16. Helmet Mounted Displays – Retinal Display
17. Laser Communications
18. Micro-Scale Fuel Cells
19. - Catalytic Micro-Combustors
20. - Micro-Reformers
21. Mini Mass-Storage Device
22. - Compact Holographic Memory
23. Miniaturized Low-Power Processors
24. Miniaturized Mass-Storage Device
25. - Nano-Electromechanical System (NEMs)
26. Multi-Hop-Band-Mode-Function Jam Resistant Radio
27. - Adaptive Transceiver
28. - Antenna
29. Nano-Composite Solar Cell
30. - Inorganic Semiconductor Nanorods
31. Next Generation Battery
32. - Nickel-Metal Hydride Battery
33. Next Generation Secure IFF
34. - Laser Interrogator
35. Satellite Control – Autonomous Satellite Control Software
36. – Cluster/Constellation Control
37. Software Programmable Radios
38. - Adaptive Computing System-on-Chip
39. Super Computer Processor
40. Tasking – Automated Sensor Cross-Cueing Tool
41. Tasking – Automated Sensor Cueing Tool
42. UV Control – Autonomous Vehicle Control Software
43. UV Speech Computer Control Tool
44. Wearable Computer
45. Wireless Network – Ultra Wideband Device

Source: Booz Allen Hamilton and ODUSD(IP)

Crafting Defense Business Strategies by Functional Capability

Actor	Objective	Process
Emerging Defense Suppliers	Better access to U.S. Defense Industrial Base	• Assess industrial capabilities by critical technologies using warfighting capability framework for reference. • Assess own technologies which may be gap fillers or innovate/ revolutionize existing capabilities.
Global Defense Suppliers		• Develop business strategies using compendium of defense technology suppliers to do competitive assessment and for potential joint ventures.

Source: ODUSD(IP)

The Defense Industrial Base Capability Study Series “Navigation Aids” for Emerging and Global Suppliers

Report Data

Appendix A

DIBCS Command & Control Capability Framework

Monitor & Collect Data

An initial picture or impression developed by a commander of the operational environment by observing the situation and orchestrating the collection of different types of information from different sources.

Obtain Information on Adversary Forces and Assets
Equal

- Provide tasking to gather relevant Intelligence Preparation of Battlespace (IPB) concerning adversary states/actors/inhabitants of an area

Obtain Information on Adversary Forces and Assets
Be Ahead

- Provide tasking to locate, identify, track, and observe adversary forces/actors anywhere (all domains)/anytime in near-real-time; to include assessment of size, deployment, and status
- Provide tasking for persistent surveillance of adversary leadership figures, facilities, proliferation mechanisms and high value forces in the face of adversary denial and deception efforts
- Provide tasking to gather data concerning adversary intent and methodology for carrying out the movement, deployment, and maintenance of forces
- Provide tasking to identify all classes of targets and their status
- Provide tasking for early warning of hostile actions

Obtain Information on Adversary Forces and Assets
Be Way Ahead

- Provide shared control to synchronize cross-domain, cross-discipline collection efforts, execution of sensors, and exploitation of outputs
- Understand and detect potential adversaries' counter collection and denial (CC&D) against our monitor and collection capabilities
- Provide tasking to sense, identify, and track as necessary suspected CBRNE effluents, biomarkers, or facilities

Obtain Information on Non-Aligned Forces and Assets
Equal

- Provide tasking to gather relevant intelligence preparation of the battlefield (IPB) data concerning the non-aligned states/actors/inhabitants of an area

Obtain Information on Non-Aligned Forces and Assets
Be Ahead

- Provide tasking to locate, identify, track and observe non-aligned forces/actors anywhere (all domains)/anytime in near-real-time

Monitor & Collect Data – Continued

Obtain Information on Friendly Forces and Assets
Be Ahead

- Provide tasking to blue forces (Joint and Combined) to report location and status of friendly forces/actors -- prompt and timely, in many cases on a near-continuous/real-time basis

Obtain Geospatial Information
Equal

- Provide tasking to obtain precise mapping and geodesy information

Obtain Weather Information
Be Ahead

- Provide tasking to provide continuous, highly accurate information on current and projected environmental conditions that will affect the ability of assigned forces to plan, execute, and support the plan

Obtain Logistics Information
Neutral

- Task the engineering evaluation of structures to determine suitability for a particular use

Obtain Logistics Information
Be Ahead

- Task, collect, fuse, and assess friendly unit/equipment/weapon systems status reports (SORTS/SITREPS)
- Obtain data from logistics C2 systems to include total asset visibility, management for assets being processed, moved or stored from supplier to consumer, and in-transit tracking of mobility operations (Note: Logistics C2 is part of the Focused Logistics sector)

Obtain Political and Military Information
Equal

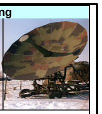
- Monitor and report world events and relevant government/public indicators/reactions relevant to the campaign

Appendix B

Critical Technologies for Command & Control Organized by Broad Industrial Areas

Communications and Networking

These technologies optimize communication channels in terms of their data throughput rates, capacity, security, and mobility. Bandwidth enhancers and bandwidth sharing tools expand the content and detail of the information being exchanged, as well as its update frequency. Wireless technology allows a channel to be established anywhere while robust security measures keep the data on that channel private.



♦ 3rd Generation Wireless Device (UWCC – 3G)	♦ Digital Signal Processor
♦ 802.16-Compatible Device	♦ Drive-by-Wire
♦ Active Network Management Tool	♦ Encrypted Switches
♦ Adaptive Jitter Buffer	♦ Extremely High Frequency (EHF) Transmitter/Receiver
♦ Airborne Data Link	♦ Frequency Hopping Equipment
♦ Asset Preemption Tool	♦ Global System for Mobile Communications (GSM) Phones
♦ Automated Security Self-Evaluation Tool (ASSET) ♦ Automatic Bandwidth Adjustment Tool ♦ Automatic Fault Detection/Isolation/Correction Tool ♦ Automatic Network Device Discovery and Configuration Tool ♦ Bandwidth Accelerator ♦ Bandwidth Compression Tool ♦ Bandwidth Controller ♦ Bandwidth on Demand Tool ♦ Beam Formation/Atmospheric Compensation Tool ♦ Burst Communications Receiver/Transceiver	♦ Handheld, Portable Satellite Phone ♦ High Bandwidth Conduit ♦ High Bandwidth Router ♦ Infrared Wireless Communications Controller ♦ Intersatellite Links ♦ Intraflight Data Link (IFDL) ♦ Laser Communications (Lasercom) ♦ Link Monitor Software ♦ Long-Wavelength Radio Transmitter/Receiver ♦ LPI/LPD Imagery Link
♦ Channel Aggregation Tool ♦ Code Division Multiple Access (CDMA) Device	♦ Microwave Link ♦ Monitoring Tool
♦ Data Crosslink	♦ Multiband Multiplexers

Data Management

In order to utilize the large volumes of data intrinsic to modern battlefield awareness, information must be securely saved and rapidly accessed. This requires hardware storage media to house the data and software to track, retrieve, and exploit the database information.

♦ Activities Tracking Information Database	♦ Machine Readable Cataloguing (MARC) Tool
♦ Authentication Device ♦ Authorization Management and Advanced Access Control Models (AM&AACM)	♦ Massive Data Storage Device ♦ Master Air Attack Plan (MAAP) Tool
♦ Automated Data, Information & Information Request Tagging ♦ Compliance Management Software	♦ Message Processing Tool ♦ Miniaturized Mass Storage Device
♦ Consistent Data Playback Tool	♦ Non-volatile RAM
♦ Cryptographic Module Validation Program (CMVP)	♦ Object Oriented Database
♦ Data Conversion Tool	♦ Optical Storage Device
♦ Data Import/Export Tool	♦ Parallel Data Processing/Data Reduction Software
♦ Data Mining Software	♦ Pattern Recognition Software
♦ Data Synchronization Tool ♦ Data Warehouse ♦ Database Application Development Toolkit ♦ Distributed Geospatial Meta Database ♦ Document Tagging Tool	♦ Real-Time Data Handling/Storage Tool ♦ Relational Database ♦ Secure Database Replicator ♦ Secure Portable Data Storage Device ♦ Social Software Analytics
♦ Dynamic Database Fusion Tool ♦ High-Capacity On-board Satellite Data Storage	♦ Spatial Indexing Software ♦ Temporal Indexing Software
♦ High-Volume Imagery Database ♦ Image Tagging Tool ♦ Intelligent Data Retrieval Tool ♦ Knowledge Management Software	♦ Topicgraphical Indexing Software ♦ Traffic Management Software ♦ Web-enabled Timeline Analysis System (WebTAS)

Appendix C

A Compendium of Representative Defense Technology Suppliers with Transformational Capabilities

Technology Suppliers[1]

Company Name	Est.	Location	Employees	Sales (US$M)	Website
Collaboration Management - Collaborative Intelligence Fusion Tool					
Alcatel (Alsthom Group)	1985	Paris, France	60,486	15,731.0	www.alcatel.com
ALPHATECH, Inc.	1979	Arlington, VA	200	40.0	www.alphatech.com
BTG's Defense Intelligence Business Group	-	Fairfax, VA	-	-	web.btg.com
General Dynamics Advanced Information Systems	1952	Arlington, VA	67,600	16,617.0	www.gd-ais.com
QinetiQ, Ltd.	2001	Hampshire, UK	9,000	1,399.1	www.qinetiq.com
Swedish Defense Research Agency's FOI Stockholm Information Fusion Group	1986	Stockholm, Sweden	1,300	136.0	www.foa.se
Collaboration Management - Collaborative Virtual Workspace					
CACI International, Inc.	1962	Arlington, VA	7,500	843.1	www.caci.com
Citrix Systems, Inc.	1989	Fort Lauderdale, FL	1,885	588.6	www.citrix.com
Collaborative Laboratories for Europe (CIBIT): De Utrecht; Aspen Enterprises, Ltd.; Learning Futures	1988	Netherlands, Brent Knoll, U.K., Abersychan, Wales	70	n.a.	www.cibit.com www.aspen.uk.com www.learningfutures.ndirect.uk
MatrixOne, Inc.	1983	Westford, MA	450	109.4	www.matrixone.com
metalayer AG	1999	Zurich-Kloten, Switzerland	32	-	www.metalayer.com
Silverline Technologies, Ltd.	1997	Warwick, UK	22	3.6	www.silverline.com
Communications and Networking - Bandwidth Accelerator					
AirZip	2000	Berkshire, U.K.	10	0.7	www.airzip.com
Expand	1998	Roseland, NJ	40	4.0	www.expand.com
Flashnetworks	1996	Amsterdam, The Netherlands	80	-	www.flashnetworks.com
InterWAVE Communications Int'l, Ltd.	1994	Menlo Park, CA	195	30.0	www.iwv.com
Venturi Wireless	1996	Sunnyvale, CA	39	-	www.venturiwireless.com
Communications and Networking - Data Link - Airborne Data Link					
BAE Systems	1977	Bristol, U.K.	68,400	14,911.2	www.baesystems.com
BES Systems, Ltd.	1998	Givataim, Israel	20	3.0	www.bes.co.il
General Dynamics United Kingdom, Ltd.	1952	Oakdale, South Wales, U.K.	67,600	16,617.0	www.generaldynamics.uk.com
Harris Corporation	1895	Melbourne, FL	10,200	2,092.7	www.harris.com

[1] Companies listed are representative; the list is not exhaustive. Inclusion or exclusion does not imply future business opportunities with or endorsement by DoD. Sources include: Hoover's, AMADEUS (Analyse MAjor Databases from EUropean Sources), open source internet research, and telephone polling.

Technology Suppliers[1]

Company Name	Est.	Location	Employees	Sales (US$M)	Website
Communications and Networking - Data Link - Airborne Data Link (continued)					
L-3 Communications (Communications Systems - West Division)	1997	Salt Lake City, UT	38,700	5,061.6	www.l-3.com/csw
The Aero Telemetry Corporation	-	Huntington Beach, CA	-	-	www.aerotelemetry.com
Communications and Networking - Data Link - Airborne Data Link - Field Programmable Gate Array					
Altera Corporation	1983	San Jose, CA	2,000	827.2	www.altera.com
Atmel Corporation	1984	San Jose, CA	7,900	1,330.6	www.atmel.com
Faraday Technology Corporation	1993	Hsinchu, Taiwan	462	96.2	www.faraday-tech.com
Toshiba Design & Manufacturing Service Corporation	1965	Tokyo, Japan	165,776	47,191.8	www.toshiba.com
Xilinx	1984	San Jose, CA	2,612	1,397.8	www.xilinx.com
Communications and Networking - Data Link - Airborne Data Link - Software-Definable Transceiver					
Allamat Electonic, Ltd.	-	Dobris, Czech Republic	-	-	www.allamat.cz
AMI Semiconductor Belgium BVBA	1966	Oudenaarde, Belgium	2,569	454.2	www.amis.com
MicroStrain, Inc.	1986	Burlington, VT	20	3.0	www.microstrain.com
Motorola	1953	Phoenix, AZ	88,000	27,058.0	www.motorola.com
Rohde & Schwarz GmbH & Co KG	1933	Munich, Germany	5,885	992.6	www.rsd.de
Silicon Laboratories, Inc.	1996	Austin, TX	486	325.3	www.silabs.com
Communications and Networking - Data Link - Intraflight Data Link (IFDL)					
Northrop Grumman	1929	Los Angeles, CA	123,000	26,200.0	www.northgrum.com
Symetrics Industries, LLC	1962	Melbourne, FL	70	18.0	www.symetrics.com
Communications and Networking - Optical Communications - Intersatellite Links					
Ball Aerospace Technologies Corporation	1956	Broomfield, CO	2,505	491.2	www.ball.com
Matra Marconi Space[2]	1990	Germany	3,670	-	www.matra-marconi-space.com
Northrop Grumman	1929	Redondo Beach, CA	123,000	26,200.0	www.northgrum.com
Oerlikon-Contraves Group	1936	Zurich, Switzerland	7,435	1,919.5	www.oerlikoncontraves.com
SINTEF	1950	Trondheim., Norway	1,700	-	www.sintef.no

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[2] Matra Marconi Space merged with EADS in 2003.

Source: Booz Allen Hamilton and ODUSD(IP)

Appendix A & B - DIBCS Command & Control Capability Framework and Critical Technologies Organized by Broad Industrial Areas

Monitor & Collect Data

An initial picture or impression developed by a commander of the operational environment by observing the situation and orchestrating the collection of different types of information from different sources.

Obtain Information on Adversary Forces and Assets Equal

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Obtain Geospatial Information Equal

- Provide tasking to obtain precise mapping and geodesy information

Obtain Weather Information Be Ahead

- Provide tasking to provide continuous, highly accurate information on current and projected environmental conditions that will affect the ability of assigned forces to plan, execute, and support the plan

Obtain Logistics Information Neutral

- Task the engineering evaluation of structures to determine suitability for a particular use

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- Obtain data from logistics C2 systems to include total asset visibility, management for assets being processed, moved or stored from supplier to consumer, and in-transit tracking of mobility operations (Note: Logistics C2 is part of the Focused Logistics sector)

Obtain Political and Military Information Equal

- Monitor and report world events and relevant government/public indicators/reactions relevant to the campaign

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802.16-Compatible Device	Drive-by-Wire
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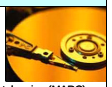
Adaptive Jitter Buffer	Extremely High Frequency (EHF) Transmitter/Receiver
Airborne Data Link	Frequency Hopping Equipment
Asset Preemption Tool	Global System for Mobile Communications (GSM) Phones
Automated Security Self-Evaluation Tool (ASSET)	Handheld, Portable Satellite Phone
Automatic Bandwidth Adjustment Tool	High Bandwidth Conduit
Automatic Fault Detection/Isolation/Correction Tool	High Bandwidth Router
Automatic Network Device Discovery and Configuration Tool	Infrared Wireless Communications Controller
Bandwidth Accelerator	Intersatellite Links
Bandwidth Compression Tool	Intraflight Data Link (IFDL)
Bandwidth Controller	Laser Communications (Lasercom)
Bandwidth on Demand Tool	Link Monitor Software
Beam Formation/Atmospheric Compensation Tool	Long-Wavelength Radio Transmitter/Receiver
Burst Communications Receiver/Transceiver	LPI/LPD Imagery Link
Channel Aggregation Tool	Microwave Link
Code Division Multiple Access (CDMA) Device	Monitoring Tool
Data Crosslink	Multiband Multiplexers

Data Management

In order to utilize the large volumes of data intrinsic to modern battlefield awareness, information must be securely saved and rapidly accessed. This requires hardware storage media to house the data and software to track, retrieve, and exploit the database information.



Activities Tracking Information Database	Machine Readable Cataloguing (MARC) Tool
Authentication Device	Massive Data Storage Device
Authorization Management and Advanced Access Control Models (AM&AACM)	Master Air Attack Plan (MAAP) Tool
Automated Data, Information & Information Request Tagging	Message Processing Tool
Compliance Management Software	Miniaturized Mass Storage Device
Consistent Data Playback Tool	Non-volatile RAM
Cryptographic Module Validation Program (CMVP)	Object Oriented Database
Data Conversion Tool	Optical Storage Device
Data Import/Export Tool	Parallel Data Processing/Data Reduction Software
Data Mining Software	Pattern Recognition Software
Data Synchronization Tool	Real-Time Data Handling/Storage Tool
Data Warehouse	Relational Database
Database Application Development Toolkit	Secure Database Replicator
Distributed Geospatial Meta Database	Secure Portable Data Storage Device
Document Tagging Tool	Social Software Analytics
Dynamic Database Fusion Tool	Spatial Indexing Software
High-Capacity On-board Satellite Data Storage	Temporal Indexing Software
High-Volume Imagery Database	Topicgraphical Indexing Software
Image Tagging Tool	Traffic Management Software
Intelligent Data Retrieval Tool	Web-enabled Timeline Analysis System (WebTAS)
Knowledge Management Software	

- Assess industrial capabilities by critical technologies using warfighting capability framework for reference.
- Assess own technologies which may be gap fillers or innovate/ revolutionize existing capabilities.

Source: Booz Allen Hamilton and ODUSD(IP)

Appendix C – A Compendium of Representative Defense Technology Suppliers with Transformational Capabilities

Technology Suppliers[1]					
Company Name	**Est.**	**Location**	**Employees**	**Sales (US$M)**	**Website**
Collaboration Management - Collaborative Intelligence Fusion Tool					
Alcatel (Alsthom Group)	1985	Paris, France	60,486	15,731.0	www.alcatel.com
ALPHATECH, Inc.	1979	Arlington, VA	200	40.0	www.alphatech.com
BTG's Defense Intelligence Business Group	-	Fairfax, VA	-	-	web.btg.com
General Dynamics Advanced Information Systems	1952	Arlington, VA	67,600	16,617.0	www.gd-ais.com
QinetiQ, Ltd.	2001	Hampshire, UK	9,000	1,399.1	www.qinetiq.com
Swedish Defense Research Agency's FOI Stockholm Information Fusion Group	1986	Stockholm, Sweden	1,300	136.0	www.foa.se
Collaboration Management - Collaborative Virtual Workspace					
CACI International, Inc.	1962	Arlington, VA	7,500	843.1	www.caci.com
Citrix Systems, Inc.	1989	Fort Lauderdale, FL	1,885	588.6	www.citrix.com
Collaborative Laboratories for Europe (CIBIT): De Utrecht; Aspen Enterprises, Ltd.; Learning Futures	1988	Netherlands, Brent Knoll, U.K., Abersychan, Wales	70	n.a.	www.cibit.com www.aspen.uk.com www.learningfutures.ndirect.uk
MatrixOne, Inc.	1983	Westford, MA	450	109.4	www.matrixone.com
metalayer AG	1999	Zurich-Kloten, Switzerland	32	-	www.metalayer.com
Silverline Technologies, Ltd.	1997	Warwick, UK	22	3.6	www.silverline.com
Communications and Networking - Bandwidth Accelerator					
AirZip	2000	Berkshire, U.K.	10	0.7	www.airzip.com
Expand	1998	Roseland, NJ	40	4.0	www.expand.com
Flashnetworks	1996	Amsterdam, The Netherlands	80	-	www.flashnetworks.com
InterWAVE Communications Int'l, Ltd.	1994	Menlo Park, CA	195	30.0	www.iwv.com
Venturi Wireless	1996	Sunnyvale, CA	39	-	www.venturiwireless.com
Communications and Networking - Data Link - Airborne Data Link					
BAE Systems	1977	Bristol, U.K.	68,400	14,911.2	www.baesystems.com
BES Systems, Ltd.	1998	Givataim, Israel	20	3.0	www.bes.co.il
General Dynamics United Kingdom, Ltd.	1952	Oakdale, South Wales, U.K.	67,600	16,617.0	www.generaldynamics.uk.com
Harris Corporation	1895	Melbourne, FL	10,200	2,092.7	www.harris.com

[1] Companies listed are representative; the list is not exhaustive. Inclusion or exclusion does not imply future business opportunities with or endorsement by DoD. Sources include: Hoover's, AMADEUS (Analyse MAjor Databases from EUropean Sources), open source internet research, and telephone polling.

Technology Suppliers[1]					
Company Name	**Est.**	**Location**	**Employees**	**Sales (US$M)**	**Website**
Communications and Networking - Data Link - Airborne Data Link (continued)					
L-3 Communications (Communications Systems - West Division)	1997	Salt Lake City, UT	38,700	5,061.6	www.l-3.com/csw
The Aero Telemetry Corporation	-	Huntington Beach, CA	-	-	www.aerotelemetry.com
Communications and Networking - Data Link - Airborne Data Link - Field Programmable Gate Array					
Altera Corporation	1983	San Jose, CA	2,000	827.2	www.altera.com
Atmel Corporation	1984	San Jose, CA	7,900	1,330.6	www.atmel.com
Faraday Technology Corporation	1993	Hsinchu, Taiwan	462	96.2	www.faraday-tech.com
Toshiba Design & Manufacturing Service Corporation	1965	Tokyo, Japan	165,776	47,191.8	www.toshiba.com
Xilinx	1984	San Jose, CA	2,612	1,397.8	www.xilinx.com
Communications and Networking - Data Link - Airborne Data Link - Software-Definable Transceiver					
Allamat Electonic, Ltd.	-	Dobris, Czech Republic	-	-	www.allamat.cz
AMI Semiconductor Belgium BVBA	1966	Oudenaarde, Belgium	2,569	454.2	www.amis.com
MicroStrain, Inc.	1986	Burlington, VT	20	3.0	www.microstrain.com
Motorola	1953	Phoenix, AZ	88,000	27,058.0	www.motorola.com
Rohde & Schwarz GmbH & Co KG	1933	Munich, Germany	5,885	992.6	www.rsd.de
Silicon Laboratories, Inc.	1996	Austin, TX	486	325.3	www.silabs.com
Communications and Networking - Data Link - Intraflight Data Link (IFDL)					
Northrop Grumman	1929	Los Angeles, CA	123,000	26,200.0	www.northgrum.com
Symetrics Industries, LLC	1962	Melbourne, FL	70	18.0	www.symetrics.com
Communications and Networking - Optical Communications - Intersatellite Links					
Ball Aerospace Technologies Corporation	1956	Broomfield, CO	2,505	491.2	www.ball.com
Matra Marconi Space[2]	1990	Germany	3,670	-	www.matra-marconi-space.com
Northrop Grumman	1929	Redondo Beach, CA	123,000	26,200.0	www.northgrum.com
Oerlikon-Contraves Group	1936	Zurich, Switzerland	7,435	1,919.5	www.oerlikoncontraves.com
SINTEF	1950	Trondheim., Norway	1,700	-	www.sintef.no

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[2] Matra Marconi Space merged with EADS in 2003.

- Develop business strategies using compendium of defense technology suppliers to do competitive assessment and for potential joint ventures.

Source: Booz Allen Hamilton and ODUSD(IP)